

CLAIMS

1. A thermoelectric module comprising support  
substrates, a plurality of wiring conductors formed on  
5 the opposing surfaces of the support substrates, a  
plurality of thermoelectric elements, and solder layers  
formed between said wiring conductors and said  
thermoelectric elements, wherein the total projected  
10 area (Sv) of voids contained in said solder layers  
projected onto the surfaces of the support substrates on  
the side where the solder layers are in contact via the  
wiring conductors is from 1 to 20% of the total area  
(St) of the surfaces on where the solder layers are in  
contact with the wiring conductors.
- 15 2. A thermoelectric module according to claim 1,  
wherein said thermoelectric elements are provided with  
plated layers on the surfaces in contact with the solder  
layers.
- 20 3. A thermoelectric module according to claim 2,  
wherein said plated layers are formed by plating with  
nickel and/or gold.
4. A thermoelectric module according to claim 1,  
wherein said solder layers have an average thickness of  
10 to 50  $\mu\text{m}$ .
- 25 5. A thermoelectric module according to claim 1,  
wherein the voids contained in said solder layers have  
an average diameter of 1 to 100  $\mu\text{m}$ .
- 30 6. A thermoelectric module according to claim 1,  
wherein said voids have nearly a circular shape when  
they are projected onto the surfaces of the support  
substrates on the side in contact via said wiring  
conductors.
- 35 7. A thermoelectric module according to claim 1,  
wherein said solder layer comprises an Sn-Sb solder  
and/or an Au-Sn solder.

8. A thermoelectric module according to claim 1, wherein said thermoelectric elements contain at least two or more kinds of elements selected from the group consisting of Bi, Sb, Te and Se.

5        9. A process for producing a thermoelectric module having at least support substrates, a plurality of wiring conductors formed on the opposing surfaces of the support substrates and a plurality of thermoelectric elements, by applying a solder paste containing a void-  
10        forming agent onto the surfaces of either the wiring conductors or the thermoelectric elements in the thermoelectric module, and joining said wiring conductors and said thermoelectric elements together by the heat treatment.

15        10. A process for producing a thermoelectric module according to claim 9, wherein the total projected area ( $S_v$ ) of voids contained in said solder layers projected onto the surfaces of the support substrates on the side where the solder layers are in contact via the  
20        wiring conductors is from 1 to 20% of the total area ( $S_t$ ) of the surfaces on where the solder layers are in contact with the wiring conductors.

25        11. A process for producing a thermoelectric module according to claim 9, wherein said paste is prepared by using at least a solder powder and a void-forming agent, the void-forming agent being a resin having a melting point lower than that of the solder powder.

30        12. A process for producing a thermoelectric module according to claim 11, wherein said solder powder has a melting point which is not higher than 400°C.